

JAPAN

EDICT OF GOVERNMENT

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JIS B 9711 (2002) (English): Safety of machinery
-- Minimum gaps to avoid crushing of parts of the
human body

ISO INSIDE

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*The citizens of a nation must
honor the laws of the land.*

Fukuzawa Yukichi

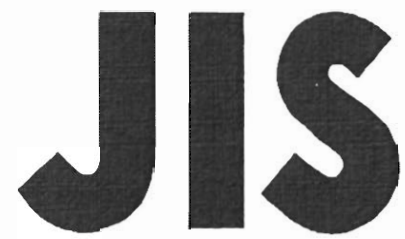
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JAPANESE
INDUSTRIAL
STANDARD

Translated and Published by
Japanese Standards Association

JIS B 9711 : 2002
(ISO 13854 : 1996)

**Safety of machinery—
Minimum gaps to avoid crushing of
parts of the human body**

ICS 13.110; 13.180

Reference number : JIS B 9711 : 2002 (E)

Foreword

This translation has been made based on the original Japanese Industrial Standard established by the Minister of Economy, Trade and Industry, and the Minister of Health, Labour and Welfare through deliberations at the Japanese Industrial Standards Committee in accordance with the Industrial Standardization Law:

Date of Establishment: 2002-07-25

Date of Public Notice in Official Gazette: 2002-07-25

Investigated by: Japanese Industrial Standards Committee

Standards Board

Technical Committee on Industrial
Machinery

JIS B 9711 : 2002, First English edition published in 2004-11

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In the event of any doubts arising as to the contents,
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Safety of machinery— Minimum gaps to avoid crushing of parts of the human body

Introduction This Japanese Industrial Standard has been prepared based on the first edition of **ISO 13854** *Safety of machinery—Minimum gaps to avoid crushing of parts of the human body* published in 1996 without modifying the technical contents. The foreword of the original International Standard has been excluded because it is not part of the provisions.

The portion of the foreword of the original International Standard that is specified in other standard have been excluded.

One method of avoiding the hazard of crushing of parts of the human body is to make use of the minimum gaps specified in this Standard.

In specifying minimum gaps, a number of aspects have to be taken into consideration, such as:

- accessibility of the crushing zones;
- anthropometric data, taking into account ethnic groups likely to be found in the countries concerned;
- technical and practical aspects.

If these aspects were further developed, the current state of the art, reflected in this Standard, could be improved.

1 Scope The object of this Standard is to enable the user (e.g. standard makers, designers of machinery) to avoid hazards from crushing zones. It specifies minimum gaps relative to parts of the human body and is applicable when adequate safety can be achieved by this method.

This Standard is applicable to risks from crushing hazards only and is not applicable to other possible hazards (e.g. impact, shearing, drawing-in).

NOTES 1 For impact, shearing or drawing-in hazards, for example, additional or other measures need to be taken.

2 The International Standard corresponding to this Standard is as follows.

In addition, symbols which denote the degree of correspondence in the contents between the relevant International Standard and **JIS** are **IDT** (identical), **MOD** (modified), and **NEQ** (not equivalent) according to **ISO/IEC Guide 21**.

ISO 13854 : 1996 *Safety of machinery—Minimum gaps to avoid crushing of parts of the human body* (IDT)

2 Normative references The following standards contain provisions which, through reference in this Standard, constitute provisions of this Standard. If the indication of the year of coming into effect is given to these referred standards, only the edition of indicated year constitutes the provision of this Standard but the revision and amendment made thereafter are not applied. The normative references without the indication of the year of coming into effect apply limiting only to the most recent edition (including amendments).

JIS B 9707 : 2002 *Safety of machinery—Safety distances to prevent danger zones being reached by the upper limbs*

NOTE : ISO 13852 : 1996 *Safety of machinery—Safety distances to prevent danger zones being reached by the upper limbs* is identical with the said standard.

ISO/DIS 12100-1 : 1992 *Safety of machinery—Basic concepts, general principles for design—Part 1 : Basic terminology, methodology*

ISO/DIS 12100-2 : 1992 *Safety of machinery—Basic concepts, general principles for design—Part 2 : Technical principles and specifications*

3 Definitions For the purposes of this Standard, the definitions given in ISO/DIS 12100-1 and JIS B 9707 : 2002 and the following definition apply.

3.1 crushing zone Zone in which the human body or parts of the human body are exposed to a crushing hazard. This hazard will be generated if

- two movable parts are moving towards one another, or
- one movable part is moving towards a fixed part.

NOTE : See also annex A.

4 Minimum gaps

4.1 Methodology for the use of this Standard The method of using this Standard shall form part of the iterative safety strategy outlined in clause 5 “Strategy for selecting safety measures” of ISO/DIS 12100-1 : 1992.

The user of this Standard shall:

- a) identify the crushing hazards;
- b) assess the risks from these hazards in accordance with ISO/DIS 12100-1, paying particular attention to the following:
 - where it is foreseeable that the risk from a crushing hazard involves different parts of the body, the minimum gap given in table 1 relating to the largest of these parts shall be applied [see also d)],
 - the unpredictable behaviour of children and their body dimensions if children are included in the population at risk,
 - where parts of the body could enter the crushing zone in a configuration other than those indicated in table 1,

- whether thick or bulky clothing (e.g. protective clothing for extreme temperatures) or tools have to be taken into account,
 - whether machinery will be used by persons wearing thick-soled footwear (e.g. clogs) which will increase the effective dimension of the foot;
- c) select from table 1 the appropriate minimum gap relating to the body part at risk (see also annex A);
- d) if adequate safety cannot be achieved by the minimum gaps selected from table 1, other or additional measures and/or means shall be used (see e.g. **ISO/DIS 12100-1**, **ISO/DIS 12100-2** and **JIS B 9707** : 2002).

If the minimum gap for the largest expected body part cannot be achieved, the following example gives one particular means of restricting access to smaller body parts.

Example : Access of larger body parts to the crushing zone can be prevented by the use of protective structures having a restricted opening, as indicated in figure 1.

The possibility of access to a crushing zone for a particular part of the body is dependant on the following:

- the gap a between the fixed and moving part or between two moving parts;
- the depth b of the crushing zone;
- the dimensions c of the opening in the protective structure and is distance d from the crushing zone.





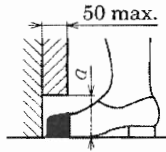


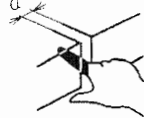
NOTE : The dimensions for openings in relation to safety distances can be found in **JIS B 9707**.

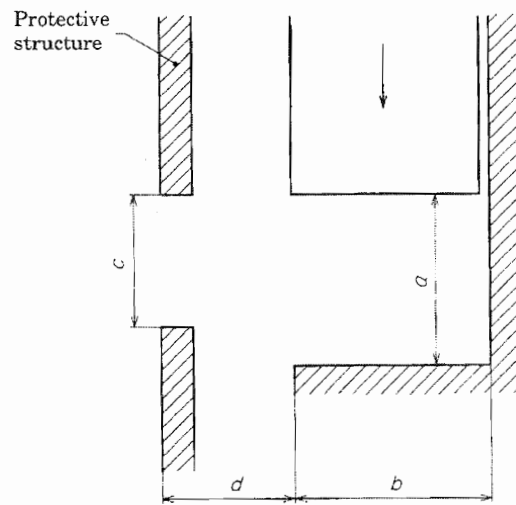
For certain applications there may be justifiable reasons to deviate from the minimum gaps in table 1. Standards dealing with these applications indicate how adequate safety can be reached.

4.2 Values Table 1 gives values for minimum gaps to avoid crushing of parts of the human body. For the selection of the appropriate minimum gap, see 4.1.

Table 1

Unit: mm

Part of body	Minimum gap, a	Illustration
Body	500	
Head (least favourable position)	300	
Leg	180	
Foot	120	
Toes	50	
Arm	120	
Hand Wrist Fist	100	
Finger	25	

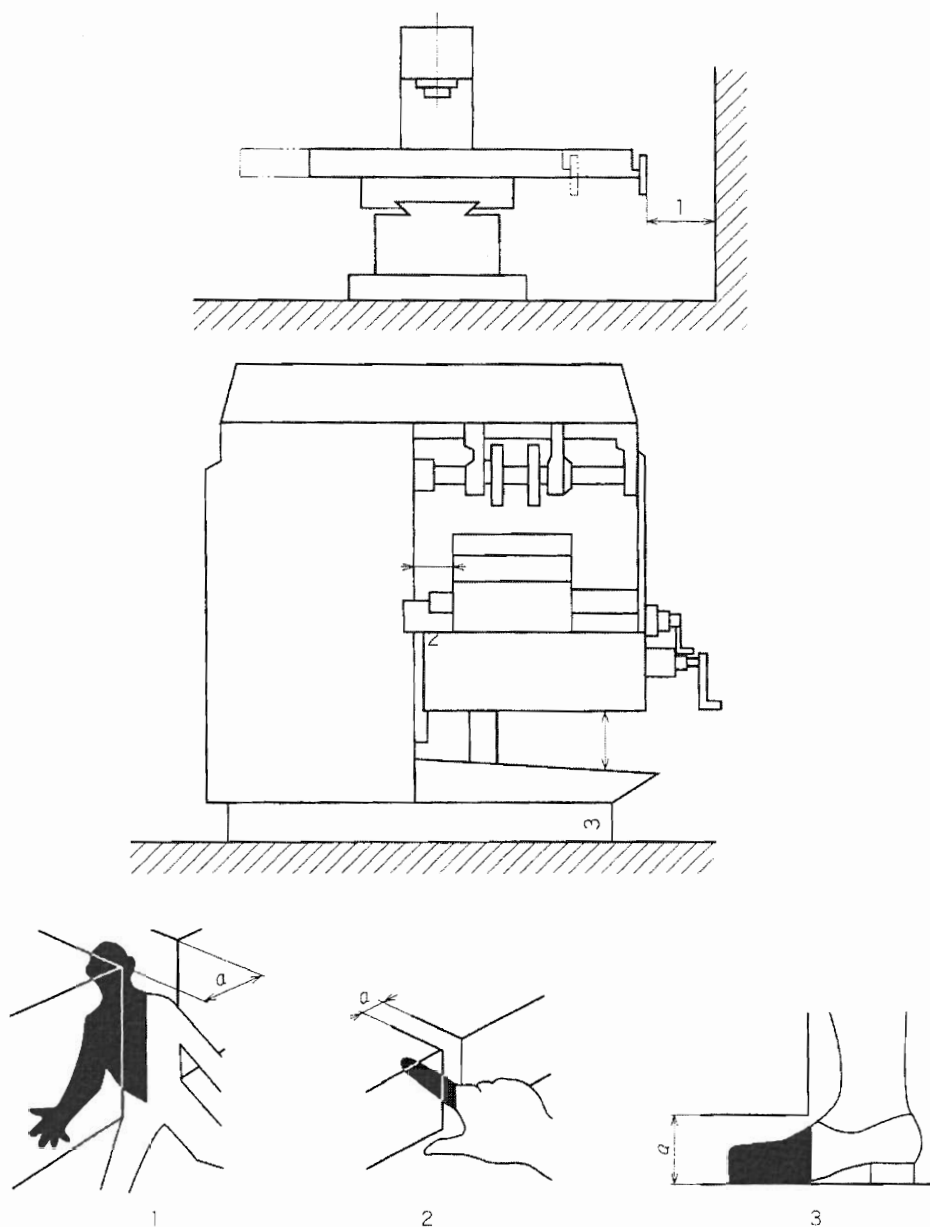


NOTE : For an explanation of the symbols, see the example in 4.1.

Figure 1

Annex A (informative)
Illustration of crushing zones

The indicated crushing zones and the parts of the human body considered in figure A.1 are examples only. For the application of risk assessment, see 4.1.



NOTE : a is the minimum gap.

Figure A.1

Errata for JIS (English edition) are printed in *Standardization Journal*, published monthly by the Japanese Standards Association, and also provided to subscribers of JIS (English edition) in *Monthly Information*.

Errata will be provided upon request, please contact:
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